NS 1.20/2: SE-78-55

RESEARCH IN SCIENCE EDUCATION

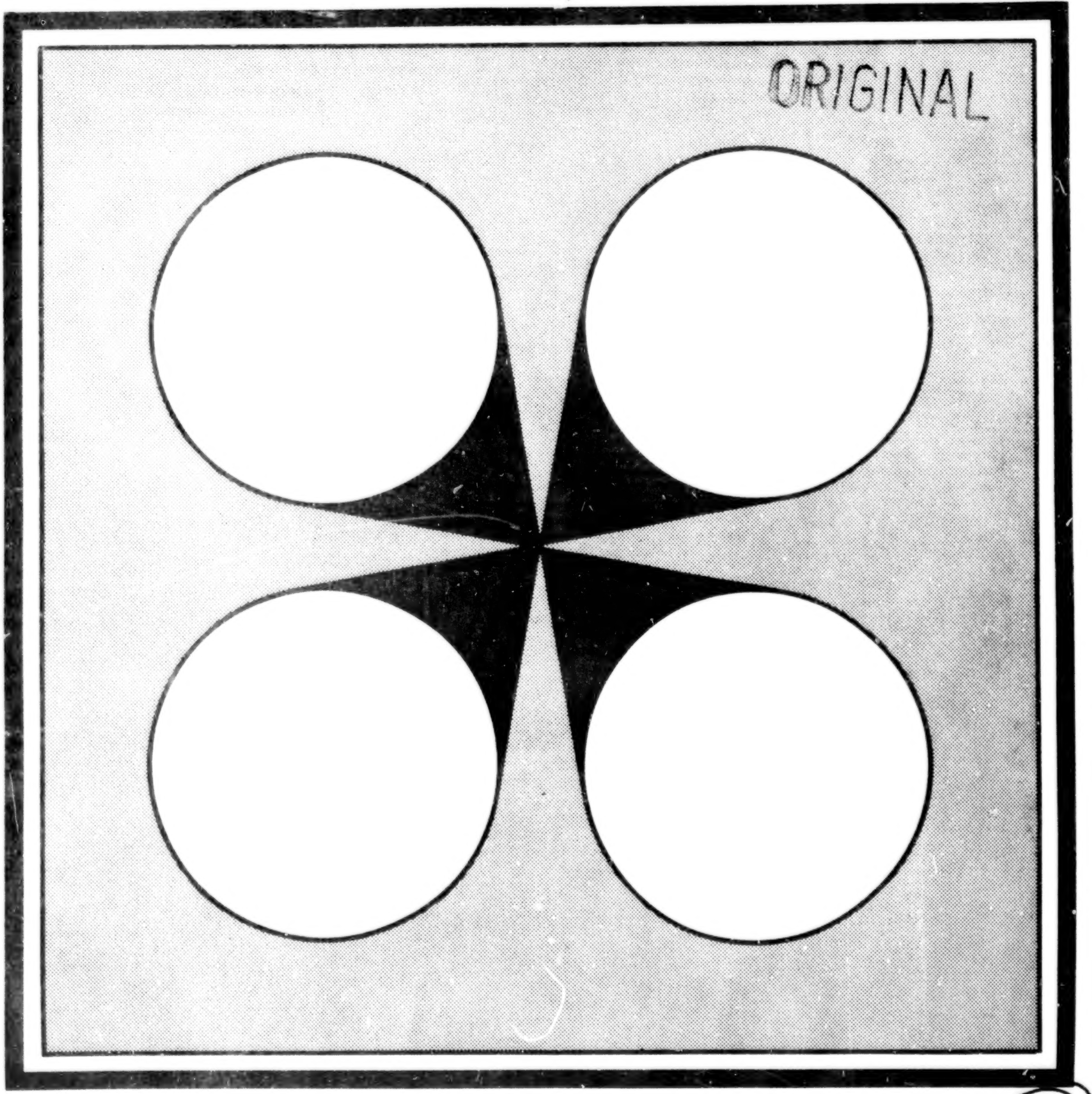
COMPLETED

Guidelines for
Preparation of Proposals

Closing Date: March 31, 1978

PROGRAM SOLICITATION

National Science Foundation
Directorate for Science Education
Division of Science Education
Development and Research
Washington, D.C. 20550



ORIGINAL

20

INTENT TO SUBMIT

To insure adequate planning for review of proposals, prospective proposers are requested to submit the postcard on the back cover, entitled "Intent to Submit," being sure to state the research project title and category. This should be done when personnel are first committed to write the proposal and by February 20, 1978, if possible. Intended only to facilitate proposal evaluation, this notification is not a commitment to submit a proposal, nor is it an essential prerequisite to submission of a proposal.

CLOSING DATE

The closing date for receipt of proposals by the Foundation under this Guide is March 31, 1978 (5:00 P.M., E.S.T.). Proposals should be sent to:

Central Processing Section
National Science Foundation
Washington, D.C. 20550
Attn: Research in Science Education Program

Hand-carried proposals should be delivered to Room 223, NSF, 1800 G Street, N.W., Washington, D.C.

PROGRAM HISTORY

The Research in Science Education Program was initiated in Fiscal Year 1977 by Congressional action which created a program for "Basic Research in Science Education."

> "The program would provide support for studies of how children and adults learn, what their learning difficulties are, how social organization affects their learning, and how they may best be motivated to learn. Support might also be provided for research into the institutions of science education. Several activities formerly supported under other programs fall directly into the category of basic research in science education, and are expected to be funded through this program."

In response to the program's Solicitation for Proposals for Research in Science Education (SE 77-55), 233 proposals were received requesting a total of $22.9 million. A list of the 24 RISE awards totaling $2.4 million appears in Appendix E.

OTHER DIVISION ACTIVITIES

	Brochure
Two-Year College Local Assessment in Science Education	SE 78-51
Two-Year College Comprehensive Assessment in Science Education	SE 78-52
Continuing Education for Scientists and Engineers	SE 78-58

CONTENTS

I. Introduction 1
  Fields of Science 1
  Educational Levels 1
  Size and Duration of Projects 1
  Who May Submit 1

II. Award Categories 1
  Category I. Research Evaluation and Synthesis 1
  Category II. Research Activities 1

III. Preparation of Proposals 2
  Proposal Format 2
  Submission of Proposals 3

IV. Proposal Evaluation 4
  Method of Selection 4
  Evaluation and Selection Criteria 4

V. Other Considerations in Submitting Proposals 5
  Assurance of Compliance with Civil Rights 5
  Grantee Organization and Management Data 5
  Types of Awards 5
  Human Subjects 5
  Access to Peer Review Information 5
  Confidential Aspects of Proposals and Awards 5
  Indirect Costs 6
  Contracting and Transferring the Project Effort 6
  NSF Evaluation of Programs 6

VI. Project and Award Management 6
  Grant Administration 6
  Pre-College Students and Experimental Curriculum Development Projects 6
  Changes in Project Operation 7
  No-Cost Extensions 7
  Publications 7
  Acknowledgment and Disclaimer 7
  Project Reporting Requirements 7

Appendices

A. Cover Sheet 9
B. Project Summary (Abstract Form) 10
C. Summary Proposal Budget (Form 1030) 11
D. Check List for Proposal Submission 13
E. RISE Awards 14

Research in Science Education
RISE

I. INTRODUCTION

In its second year of operation, the Research in Science Education (RISE) Program expects to provide up to $2.2 million for research projects in science education.

FIELDS OF SCIENCE

Eligible projects may deal with the physical, biological and social sciences, mathematics, engineering, technology, the history and philosophy of science, or may involve combinations of these disciplines. However, the practice aspects of technical, clinical, health, social, or business fields are excluded. Examples of topics outside the program are medicine, nursing, clinical psychology, social work, business administration, and the arts and humanities.

EDUCATIONAL LEVELS

Projects may be addressed to any level of science education, from pre-college through graduate science studies.

SIZE AND DURATION OF PROJECTS

No limits are placed upon the dollar amount or duration that may be requested. However, proposers should realize that especially compelling arguments for support in excess of $200,000 or 36 months must be evident.

WHO MAY SUBMIT

Proposals are invited from U.S. academic or nonacademic, profit or nonprofit organizations or combinations thereof. The Foundation strongly encourages, where appropriate, cooperative efforts between scientists and persons with experience in educational research or science education.

II. AWARD CATEGORIES

Proposals are invited in the following categories:

CATEGORY I. RESEARCH EVALUATION AND SYNTHESIS

These awards are intended to make the results of existing research related to science education more accessible to researchers and policymakers. Projects should include: 1) An *evaluation* of a number of pieces of existing research in a coherent area; 2) a *synthesis* of the theoretical propositions which can be considered to have been established on the basis of that research; and 3) a statement of further research needs.

While projects in any area of research related to science education will be considered, the Foundation is especially interested in the problems of motivation and learning in science by early adolescents (10-15 year olds) and the development and validation of new approaches to measurement and assessment in science education.

CATEGORY II. RESEARCH ACTIVITIES

A limited number of original research efforts will be supported. Projects in any area relevant to science education will be considered, but the Foundation is especially interested in:

- Motivation and learning in science among 10-15 year olds.
- Development and testing of new measures of effectiveness in science education. Both

cognitive and affective measures are of interest. Some priority will be placed on efforts to develop measures to assess the effectiveness of science education programs directed to the general public, and to in-school populations consisting of nonscience majors.

- Studies of the development of attitudes toward science among students, with special emphasis on minorities and women.
- Research on uses of microcomputers and related technology in science education or science education research.

III. PREPARATION OF PROPOSALS

PROPOSAL FORMAT

To facilitate review, each proposal must contain the following elements:

Cover Sheet
Table of Contents
Project Abstract
Narrative
Budgets
Other Commitments of Senior Personnel
Appendices

Cover Sheet

The cover sheet must be prepared in accordance with Appendix A and must specify one of the following two categories:

I. Research Evaluation and Synthesis
II. Research Activities

The level of study (e.g., pre-college introductory or upper level undergraduate, graduate, continuing education, etc.) as well as subject matter (e.g., chemistry, engineering, interdisciplinary science) should be identified.

Table of Contents

Prepare a table of contents to facilitate review and evaluation.

Project Abstract (See Appendix B)

The abstract is to be a clear and simple precis employing a minimum of technical terminology, and accurately describing the proposed project. State the objectives of the proposed research and the basic elements of the research plan. As much detail as possible, typed single spaced, should be provided within the space limitations of the form.

Narrative

The narrative must not exceed 30 double-spaced pages and should include:

1. Topic: Provide a statement and description of the topic addressed and a clear specification of the question or problem to be studied.

Proposers are to present a case for the projected research in light of deficiencies in existing knowledge or in terms of contributions and significance to the research knowledge base. Include critical literature references and evidence of need. Where appropriate, cite past work in important and relevant areas.

2. Significance: Discuss how results of the work might eventually guide further research or lead to better practices in science education. Indicate significant public policy areas in science education that might be affected by the findings.

3. Plan: Describe the procedures to be followed in carrying out the project. Be specific, and state reasons for the procedures planned.

Category I proposals must describe a set of procedures for selecting the research to be evaluated and append an illustrative bibliography. They should also state procedures for assessing both internal and external validity of the research reviewed and describe how the task of synthesizing the results of validated research will be accomplished.

Category II proposals must include a detailed design for conducting the research proposed. Matters of sampling, statistiscal analysis, data availability, relevant previous research, theoretical basis, and the like must, when applicable be discussed.

4. Schedule of Activities: Identify project starting date, termination dates and other significant progress points. Use milestone charts, or other graphic or verbal presentation techniques which clarify the research process and timetable.

5. Personnel Qualifications: Briefly describe the education and experience of the principal investigator and other staff and relate these qualifications to the proposed project activities. Indicate how the skill mix (scientists, science educators, and science education researchers) will help achieve project goals. Include vitae in an appendix.

6. Organization and Management Plan: Specify the proposed structure for operating the project and the responsibilities of key personnel.

7. Dissemination of Results: Proposals should describe plans for facilitating the utilization of the research results by interested and appropriate audiences.

Budget Matters

Two budgets are required. The relationship between expenditures and activities must be provided in a detailed functional budget which relates costs to project tasks and shows the basis for the calculation of each item. In addition, the Foundation requires a Summary Proposal budget prepared in accordance with Form 1030 (Appendix C). Sufficient travel funds should be included in proposal budgets to allow visits to NSF for preliminary and final reporting. Note that indirect costs should be calculated on the basis of the institution's research rate.

Other Commitments of Senior Personnel

Each proposal must list all current projects, in addition to the proposed project, to which the senior personnel have committed a portion of their time, whether or not salary for the person involved is included in the budgets of the various projects. This information should include the titles and dates of current grants or contracts, the source of funds, annual budget levels, and the man-months devoted to each project by each of the senior personnel. The proposal must also provide analogous information for *all* other *proposed* projects which are being considered by, or which will be submitted in the near future to, other possible sponsors including other Foundation programs. Concurrent submission of a proposal to other organizations will not prejudice its review by the Foundation.

Appendices

Appendices may be used to provide background or supporting information. It should be kept in mind, however, that reviewers' time is limited and voluminous appendices may not be studied carefully.

SUBMISSION OF PROPOSALS

1. Proposals must be received by NSF before 5 p.m., March 31, 1978.

2. Fifteen (15) copies of the complete proposal are required.

3. Three (3) extra copies of the Cover Sheet and Abstract are required.

4. Copy must be typed doublespaced on one side only of 8½" x 11" paper.

5. Pages are to be numbered at the bottom.

6. Proposal copies are to be assembled in the order shown above, and stapled in the upper left hand corner, but not otherwise bound.

7. The original, signed Cover Sheet is the letter of transmittal. Institutional letters of endorsement or transmittal supporting letter, institutional forms, etc., if included, must be appended to the proposal.

8. Proposals must be securely bound in a single package and either mailed to:

Central Processing Section
National Science Foundation
Washington, D.C. 20550
ATTN: Research in Science Education

or hand delivered to Room 223, NSF, 1800 G Street, N.W., Washington, D.C.

9. To facilitate prompt acknowledgment of the arrival of the package at the Foundation, the proposer should cut out two acknowledgment-of-receipt postcards from the back cover of this guide, fill them in to identify the proposal, address one card to the project director and the other to the official authorized to sign the Cover Sheet and attach them to the Signature Copy of the Cover Sheet. When the package arrives, the date of receipt and an assigned proposal number will be stamped on the card before it is returned,

so that thereafter the proposer and the Foundation may refer to this proposal number in correspondence. If receipt is not acknowledged within 2 weeks of submission, the program office should be contacted promptly at (202/282-7745).

IV. PROPOSAL EVALUATION

METHOD OF SELECTION

There is no Foundation commitment to make an award in any category, or to make any specific number of awards. All proposals will be screened initially by Foundation staff to insure that they meet basic conditions of program relevance, as well as format, style and length requirements. Proposals meeting these requirements will be evaluated by a peer review procedure. Reviewers will include persons in the appropriate science, science education and research communities, in professional groups, and in relevant Federal agencies. When appropriate, individuals representing the public may be included as reviewers. Sole responsibility for the final decision on each proposal rests with the National Science Foundation. When necessary, there will be negotiation between the Foundation and the proposer.

EVALUATION AND SELECTION CRITERIA

For categories I and II, the criteria listed below will receive approximately equal weight and the Foundation will select those proposals which, in its judgment, offer the greatest potential for improving science education.

1. Rationale for the Study
   a. Does the project address a question of scientific or policy importance in science education?
   b. Is the proposed work adequately grounded in theory? Will it contribute to the further development of theory relevant to science education?
   c. Is the proposed project appropriate for NSF support rather than some other public or private agency?
2. Quality of the Research Plan
   a. Is the project feasible as described?
   b. Does the proposal demonstrate knowledge and understanding of previous research efforts and their relation to the proposed project?
   c. Are procedures adequately specified for each major part of the project? Are necessary data available? Are statistical and other analysis techniques appropriate and adequately specified?
   d. Is the plan for dissemination of results appropriate?
3. Personnel Qualifications and Management Plan
   a. Do the project director, key staff and consultants have pertinent science and science education skills and relevant experience?
   b. Does the staff reflect an appropriate balance of scientists, science educators, and science educational researchers necessary for adequate treatment of the problem?
   c. Is the management procedure realistic and effective?

V. OTHER CONSIDERATIONS IN SUBMITTING PROPOSALS

ASSURANCE OF COMPLIANCE WITH CIVIL RIGHTS ACT

If the applicant institution has not filed an Assurance of Compliance with Title VI of the Civil Rights Act of 1964 as required by NSF regulations, pertinent forms and a copy of the regulations may be obtained by writing to the Foundation's Division of Grants and Contracts. The required Assurance Form, when completed by the institution, should be submitted to the Division of Grants and Contracts. Once an Assurance Form has been submitted by the applicant organization, it covers all proposals subsequently submitted by any department or other unit of that organization. Individual Assurance Forms are not necessary for each application or for each proposal. If there is some question as to whether an institution has filed an Assurance of Compliance, the institution's business office should be consulted.

GRANTEE ORGANIZATION AND MANAGEMENT DATA

If your organization has not received an NSF grant within the past 2 years, please fill out the Organization and Management Information card on the back of the brochure and attach it to the original copy of the proposal.

TYPES OF AWARDS

Either grants or contracts with fee will be negotiated as appropriate.

HUMAN SUBJECTS (Interim Provision)

a. The protection of the rights and welfare of human subjects (including students) involved in research, development and related activities supported by NSF grants is the responsibility of the grantee.

b. The informed consent of the individual is a vital element in the protection of human subjects. Grantees are referred for guidance to DHEW Publication No. (NIH) 72-102, "Institutional Guide to DHEW Policy on Protection of Human Subjects," dated December 1, 1972, as amended by Part 46, Subtitle A of Title 45 of the Code of Federal Regulations, dated March 13, 1975.

c. Before a grant can be made NSF must receive a statement that research involving use of human subjects has been reviewed and approved by the appropriate Institutional Review Board at the grantee organization, and that the grantee assures NSF that it will comply with DHEW policies, as amended, regarding the use of human subjects. This statement should be received prior to the final processing of an award (60 days).

ACCESS TO PEER REVIEW INFORMATION

After final decisions have been announced, the Foundation will, upon request, inform the project director of the reasons for its decision on a proposal. Verbatim copies of reviews, not including the identity of the reviewer, will be made available to respective project directors upon specific request.

CONFIDENTIAL ASPECTS OF PROPOSALS AND AWARDS

When a proposal results in a grant, it becomes a part of the record of the Foundation's transactions, available to the public upon specific request. Information that the Foundation and the grantee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law; therefore, any information that the applicant wishes to have the Foundation consider as privileged should be clearly marked as such and sent in a separate statement, two copies of which should accompany the proposal.

A proposal that does not result in a grant may be retained by the Foundation. Such a proposal will be released only: 1) with the consent of the proposer; or 2) to the extent required by law. A proposal may be withdrawn at any time prior to final action thereon by the Foundation.

INDIRECT COSTS

Each proposal may include indirect costs at the rate approved for the institution. Proposals should specify the institution's approved rate and, if different, the rate requested for the proposed activities. The approved rate and the base for the computation may be obtained from the business officer of the institution. That person should contact the Foundation's Division of Grants and Contracts Policy and Cost Analysis Branch if the organization does not have an approved rate, or is a first-time applicant. If information is needed with regard to an approved rate, call (202/632-7545).

CONTRACTING OR TRANSFERRING THE PROJECT EFFORT

Excluding the purchase of commercially available supplies, materials, equipment, or general support services allowable under the grant, none of the research or substantive effort under an NSF grant may be contracted, or otherwise transferred to another organization without prior NSF approval. Normally, the intent to so contract is fully disclosed in the proposal submission, and evidence of NSF prior approval appears in the grant instrument. In the event the need arises to so contract after a grant has been made, the grantee must submit to the NSF Grants Officer the proposed performance statement and budget, a statement indicating the basis for selection of the contractor and a justification of the proposed arrangement. The request must be signed by the principal investigator/project director and endorsed by the Authorized Organizational Representative. NSF approval will be indicated by letter from the Grants Officer.

NSF EVALUATION OF PROGRAMS

Proposers should be aware that the Foundation may, as a part of its own program evaluation activities, carry out in-depth evaluations of selected awarded projects through independent third parties. Thus, proposers should be prepared to cooperate with evaluators eventually retained by the Foundation to analyze both the institutional context and the impact of any supported project.

VI. PROJECT AND AWARD MANAGEMENT

GRANT ADMINISTRATION

Grants will be administered according to established Foundation procedures. These procedures are described in the NSF Grant Policy Manual (NSF 77-47). Additional copies of the complete NSF Grant Policy Manual are available only by subscription, $12.00 domestic and $15.00 foreign, offered by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. The Manual is identified by NSF 77-47, and was not assigned a GPO number. The Manual is in looseleaf form for periodic updating through supplements, which will be available only through a GPO subscription.

An NSF grant is normally made to an organization, known as the grantee, rather than to the individual principal investigator or project director who proposed to conduct the project. The grant establishes a relationship between NSF and the grantee in which:

a. NSF agrees to provide financial support for the project to be performed, under the provisions of the grant instrument.
b. The grantee agrees to the performance of the project, to the prudent management of the funds provided by the grant and to the provisions of the grant instrument.

The grantee is free to accept or reject the grant. Normally, action to obtain Federal funds constitutes acceptance of a grant once it is made. However, in some cases, NSF may require written acceptance.

PRE-COLLEGE STUDENTS AND EXPERIMENTAL CURRICULUM DEVELOPMENT PROJECTS

Grantees of projects which involve pre-college students in research or development on, or pilot-testing, evaluation or revision of, experimental or innovative curriculum development projects will:

a. Provide to the school board, or comparable authority responsible for the schools considering participation in the project, information concerning the need for and purposes of the particular education project, the proposed content of the material to be used, the expected benefits to be derived, and other information to assist the jurisdiction in arriving at a decision on participation.
b. Obtain, after the responsible authority has carried out its procedures, written approval for participation in the project activities.
c. Provide information and materials to the responsible school authority to assist it in carrying out its own established procedures regarding the participation of students in project activities.
d. Provide information to the Foundation describing compliance with the above provisions.
e. Provide, in accord with NSF FY 1976 House Authorization Legislation (Public Law 94-86), in every publication, testing or distribution agreement involving instructional material developed under a grant (including but not limited to teacher's manuals, textbooks, films, tapes or other supplementary material) that such material will be made available within the school district using such material for inspection by parents or guardians of children engaged in educational programs or projects of that school district.

CHANGES IN PROJECT OPERATION

Although major changes in the conduct of the project may be proposed at any time, changes in the scope, objectives, and professional personnel of the project must be approved in advance by the Foundation. Requests should be addressed to the cognizant program manager.

NO-COST EXTENSIONS

When circumstances delay the work, a no-cost extension may be requested. This request, along with a justification, must be received at the Foundation at least 45 days before the award expiration date, contain the signatures of both the project director and the authorized institutional representative, and include a summary of progress, a budget for use of the remaining funds, and plans to complete the project.

PUBLICATIONS

The Foundation provides grant and contract support for research and education in the sciences. The grantee or contractor is wholly responsible for the conduct of such research, publication of the results therefrom, and the preparation of curricular materials. The Foundation, therefore, does not assume responsibility for such findings or their interpretation or the content of such curricular materials. Nevertheless, the Foundation retains the right to approve the distribution of such materials.

ACKNOWLEDGMENT AND DISCLAIMER

An acknowledgement of NSF support must be made in connection with the publication of any material based on or developed under a project supported by NSF to the effect that: "This (material) was prepared with the support of National Science Foundation Grant No. 00."

Any materials, books, monographs, proceedings of symposia, or similar publications supported by an NSF grant must contain a statement, immediately following the acknowledgment, that contains an expression of the following: "Any opinions, findings, conclusions or recommendations expressed (herein) are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

PROJECT REPORTING REQUIREMENTS

Interim Reports—For grants having a duration of more than 1 year, interim reports should be submitted by the project director to the RISE program staff at the end of each academic year's activities, covering such matters as 1) progress to date in comparison with the project schedule; 2) results to date of the on-going monitoring evaluation process; 3) problems encountered and methods used in solving them; and 4) circumstances or considerations which might significantly affect subsequent phases of the project. Interim reports should not include requests for NSF approval for major changes. Such requests should in all cases be the subject of separate correspondence.

Final Technical Report and Summary of Completed Project

Two copies of each report must be submitted by the project director to the NSF Division of Grants and Contracts within 90 days following the expiration of the grant. The final technical report is to contain a brief summary of activities and accomplishments of the project. A summary of the completed project should include a brief (approximately 300 words) description of the project. The description must be self-contained so as to be intelligible to the nonscientist. Generally, the grantee should indicate the project's objectives and scope, the techniques or approaches used, and its major findings and implications. The grantee should bear in mind that this Summary of Completed Project may be used, together with the project summary prepared by NSF at the time of the award, to answer inquiries by nonscientists as to the nature and significance of projects which the Foundation supports.

The grantee is no longer required to send the Final Technical Report to the cognizant NSF program officer. When the report is received in the Division of Grants and Contracts of NSF, a copy will automatically be forwarded to the program officer. These should be clearly labeled with the grant number and other identifying information as appropriate. Preprints or reprints submitted to the Division of Grants and Contracts as part of the final technical report will be forwarded to the NSF program officer.

APPENDIX A

COVER SHEET

Research in Science Education

1. Category No: I II (Circle one)

2. Descriptive Title of Project: ______________________________
   Maximum: 12 words)
   ____

3. Institution: ______________________________
   Address: City ______________ State ______________ Zip Code ________
   Grant to: ______________________________
   (Official name of organization to which grant should be made)

4. Proposed Project Director: ______________________ ______________________
   (One Only) Social Security No. *
   Title and Academic Address
   Department: ______________________
   City ______________ State ______________ Zip Code ________
   Telephone (Include area code): ______________ ______________
   (Office) (Home)

5. Disciplines(s) involved in project: ______________________________
   Level of Education: ______________________________

6. Starting date of project: ______________________________
   Proposed duration of project: ______________ months

7. Total support request from NSF: $______________________________

8. Grant number(s) of other NSF projects for which project director is responsible: ______________________________

9. Indicate if proposal has been or will be submitted in whole or in part to other possible sponsors, including NSF or other Federal agencies. (Such information will not prejudice review by the Foundation.) ______________
   ____

10. ______________________________ ______________________________
    Signature of proposed Project Director Signature of Authorizing Officer

11. ______________________________ ______________________________
    Date of Submission Typed name and title of officer authorized to sign for institution

---

* Social security numbers are used by the Foundation to monitor and facilitate the processing of numerous proposals, and to maintain award data. The number is solicited pursuant to the general authority of the Foundation under the NSF Act of 1950 as amended. Submission of social security numbers is voluntary and refusal to disclose a social security number will not affect an institution's eligibility for award.

APPENDIX B

NATIONAL SCIENCE FOUNDATION

PROJECT SUMMARY

NSF AWARD NO.

NAME OF INSTITUTION (NSF DIRECTORY NAME)		ADDRESS OF INSTITUTION (INCLUDE BRANCH/CAMPUS & COMPONENT)
PRINCIPAL INVESTIGATOR		DIVISION (OFFICE) AND DIRECTORATE Science Education Development and Research/SE
		SECTION
PROPOSAL NUMBER	FISCAL YEAR	PROGRAM Research in Science Education
TITLE OF PROJECT		
SUMMARY OF PROPOSED WORK (LIMIT TO 22 PICA OR 18 ELITE TYPEWRITTEN LINES)		

PROGRAM APPROVAL	DATE

INSTRUCTIONS FOR USE

1. Program Office will complete all items appearing on the first copy; place Proposal Folder copy in the folder, retain Program Suspense copy; and place other copies inside the folder envelope with carbons intact.
2. Division of Grants and Contracts will post award number, amount granted and inclusive project dates on copies 3 through 7 and distribute these copies.

APPENDIX C

SUMMARY
PROPOSAL BUDGET

ORGANIZATION AND ADDRESS	**FOR NSF USE ONLY** PROPOSAL NO
	DURATION (MONTHS) PROPOSED / REVISED
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	

NSF USE		NSF FUNDED MAN MONTHS			FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)
	A. SENIOR PERSONNEL (LIST BY NAME; SHOW NUMBERS OF PEOPLE IN BRACKETS; SALARY AMOUNTS MAY BE LISTED ON SEPARATE SCHEDULE) GPM 205.1b	CAL.	ACAD	SUMR		
	1. P.I./P.D.				$	$
	2. CO P.I./P.D.				$	$
	3. CO P.I./P.D.				$	$
	4. CO P.I./P.D.				$	$
	5. CO P.I./P.D.				$	$
11115	6. ( ) ◄—— SUBTOTALS A1 - A5 ——►				$	$
	FACULTY AND OTHER SENIOR ASSOCIATES (ATTACH EXTRA SHEET IF NECESSARY)	▨	▨	▨	▨	▨
	7.				$	$
	8.				$	$
	9.				$	$
	10.				$	$
	11.				$	$
11117	12. ( ) ◄—— SUBTOTALS A7 - A11 ——►				$	$
	B. OTHER PERSONNEL (LIST NUMBERS IN BRACKETS)	▨	▨	▨	▨	▨
11141	1. ( ) POSTDOCTORAL ASSOCIATES				$	$
11149	2. ( ) OTHER PROFESSIONALS				$	$
11150	3. ( ) GRADUATE STUDENTS				$	$
11152	4. ( ) UNDERGRADUATE STUDENTS				$	$
11182	5. ( ) SECRETARIAL - CLERICAL				$	$
11183	6. ( ) TECHNICAL, SHOP, OTHER				$	$
	TOTAL SALARIES AND WAGES (A+B)				$	$
11200	**C. FRINGE BENEFITS** (IF CHARGED AS DIRECT COSTS)				$	$
	TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$	$
	D. EQUIPMENT (LIST ITEMS AND DOLLAR AMOUNTS FOR EACH ITEM)				▨	▨
23181	TOTAL EQUIPMENT				$	$
	E. MATERIALS AND SUPPLIES				▨	▨
32630					$	$
	F. DOMESTIC TRAVEL				▨	▨
42111					$	$
	G. FOREIGN TRAVEL (LIST DESTINATION AND AMOUNT FOR EACH TRIP; GPM 731)				▨	▨
42112					$	$

CANCELS NSF FORMS 98, 135, 569 AND 633 EFFECTIVE 10-1-77

SUMMARY PROPOSAL BUDGET

PROPOSAL NO.

52500	H. PUBLICATION COSTS/PAGE CHARGES	$	$
62315	I. COMPUTER (ADPE) SERVICES	$	$
	J. CONSULTANT SERVICES (IDENTIFY CONSULTANTS BY NAME AND AMOUNT; GPM 516)	▨	▨
		$	$
	K. PARTICIPANT SUPPORT COSTS, IF ALLOWED BY PROGRAM GUIDE (ITEMIZE) GPM 518	▨	▨
	1. STIPENDS $	▨	▨
	2. TRAVEL $	▨	▨
	3. SUBSISTENCE $	▨	▨
	4. OTHER - SPECIFY $	▨	▨
	5. TOTAL PARTICIPANT COSTS (K1 + K2 + K3 + K4)	$	$
	L. ALL OTHER DIRECT COSTS (List items and dollar amounts. Details of subcontracts, including work statements and budget, should be explained in full in proposal.)	▨	▨
	$	▨	▨
	$	▨	▨
	$	▨	▨
	$	▨	▨
65001	TOTAL OTHER DIRECT COSTS	$	$
	M. TOTAL DIRECT COSTS (A THROUGH L)	$	$
	N. INDIRECT COSTS (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks.)	▨	▨
74100	TOTAL INDIRECT COSTS	$	$
	O. TOTAL DIRECT AND INDIRECT COSTS (M + N)	$	$
74500	P. LESS RESIDUAL FUNDS (If for further support of current project; GPM 252 and 253)	$	$
75000	Q. AMOUNT OF THIS REQUEST (O MINUS P)	$	$

REMARKS

NOTE: SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPM 233). THIS IS REVISION NO.

SIGNATURE OF PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE
SIGNATURE OF AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE

FOR NSF USE ONLY

INDIRECT COST RATE VERIFICATION			PROGRAM OFFICER APPROVAL
Date Checked	Date of Rate Sheet	Signature	

Grant Number	Amend No.	Institution	Organization	Fund Acct.	Program	Object	

	Proposal Number	Dur.	Chg.	Award Date	Proposed Amount	Propsd. Dur.	

APPENDIX D

Check List for Proposal Submission

Complete proposals help to expedite the review process and assist the applicant in meeting program requirements. The following check list is provided as an aid to assuring proposal completeness.

☐ Cover page (all items completed on requested format, Appendix A)

☐ Category designation (circle either I or II on cover page)

☐ All required signatures (project director and authorizing official)

☐ Abstract (use requested format, Appendix B)

☐ Proposal summary

☐ Narrative (double spaced, 30 pages maximum numbered at bottom)

☐ Budgets (detailed and Form 1030, Appendix C)

☐ Research rate for indirect costs

☐ Other commitments of senior personnel (see page 4)

☐ Vitae of senior personnel

☐ Fifteen copies of proposal

☐ Three extra copies of cover page and abstract

☐ Acknowledgement cards filled out

[illegible] FROM
BEST AVAILABLE COPY

MICROFILMED FROM
BEST AVAILABLE

APPENDIX E

RESEARCH IN SCIENCE EDUCATION (RISE)
DIVISION OF SCIENCE EDUCATION DEVELOPMENT AND RESEARCH

RISE Awards of Proposals Received in Response to SE77-55
(Solicitation for Proposals for Research in Science Education)

Institution	Grant Number and Title	Project Director	Amount	Duratio (months
Research Evaluation and Identification				
University of Georgia Athens GA 32609	SED77-17946; An Analysis of Research on Mathematical Abilities	Jeremy Kilpatrick Mathematics Education	$133,500	24
University of Michigan Ann Arbor MI 48109	SED77-18566; Statistical Analysis of Research Results in College Science Teaching	James A. Kulik Center for Research on Learning and Teaching	114,300	24
Northern Illinois U. Dekalb IL 60115	SED77-19157; A Review of Research on Solving Routine Problems in Pre-College Mathematics	Larry Sowder Mathematical Sciences	35,000	26
Center for the Study of Community Colleges 1047 Gayley Avenue Los Angeles CA 90024	SED77-18477; A Study of Science Instructional Programs in Two-Year Colleges	Arthur M. Cohen President	145,400	30
National Council of Teachers of Mathematics 1906 Association Drive Reston VA 22091	SED77-18564; A Study of PRiorities In School Mathematics (PRISM)	Alan Osborne Mathematics Education Ohio State University Columbus OH 43210	192,600	30
University of Colorado Boulder CO 80309	SED77-19001; Project Synthesis: An Interpretive Consolidation of Research Identifying Needs in Precollege Education	Norris Harms Education	203,300	24

RESEARCH IN SCIENCE EDUCATION (RISE)
DIVISION OF SCIENCE EDUCATION DEVELOPMENT AND RESEARCH

Awards for SE77-55

Institution	Grant Number and Title	Project Director	Amount	Duration (months)
Research Studies				
University of Illinois Urbana IL 61801	SED77-18047; Research on Thought Processes Used in 7th-10th Grade Mathematics	Robert B. Davis Curriculum Laboratory	$143,900	30
Iowa State University Ames IA 50011	SED77-18654; Measurement and Analysis of Patterns of Logical Thinking	Frederick P. DeLuca Earth Science	52,300	30
University of California Berkeley CA 94720	SED77-18914; A Research Evaluation of Scientific Reasoning Ability in Naturalistic and Laboratory Settings	Watson M. Laetsch Lawrence Hall of Science	181,000	30
Battelle Memorial Institute Columbus OH 43201	SED77-18565 (Contract); Survey of Continuing Education for Nonacademic Scientists/Engineers Provided by Industry/Government	Girard W. Levy Center for Improved Education	98,133	21
Purdue University West Lafayette IN 47907	SED77-18077; Impact of Calculators in Elementary School Mathematics: A Research Study	Grayson H. Wheatley Mathematics and Education	199,800	16
Minnesota Educational Computing Consortium 2520 Broadway Drive St. Paul MN 55113	SED77-18658; A Study of Computer Use and Literacy in Science Education	Daniel Klassen Director of Special Projects	184,100	30

MICROFILMED FROM
BEST AVAILABLE COPY

RESEARCH IN SCIENCE EDUCATION (RISE)
DIVISION OF SCIENCE EDUCATION DEVELOPMENT AND RESEARCH

Awards for SE77-55

Institution	Grant Number and Title	Project Director	Amount	Duratio (Months)
Research Studies				
Massachusetts Institute of Technology Cambridge MA 02139	SED77-19083; Assessment and Documentation of a Children's Computer Laboratory	Seymour Papert Mathematics	$180,700	30
Massachusetts Institute of Technology Cambridge MA 02139	SED77-19279; A Research Study of Computer-Based Tutoring of Mathematical and Scientific Knowledge	Ira P. Goldstein Electrical Engineering and Education	193,400	30
Research Triangle Institute Research Triangle Park NC 27709	SED77-18928; Determinants of Student Entry and Performance in the Sciences	George H. Dunteman Center for Educational Research and Evaluation	65,300	19
University of Wisconsin Madison WI 53706	SED77-18875; Systematic Investigation of the Cognitive Effects of Games on Mathematics Learning	John G. Harvey Mathematics	29,400	22
University of California Santa Barbara CA 93106	SED77-19875; Increasing the Meaningfulness of Technical Information for Novices	Richard E. Mayer Psychology	31,600	30
Northern Illinois U. DeKalb IL 60115	SED77-18491; Research Studies on the Scientific Literacy of the Attentive Public	Jon D. Miller Political Science	67,800	28

RESEARCH IN SCIENCE EDUCATION (RISE)
DIVISION OF SCIENCE EDUCATION DEVELOPMENT AND RESEARCH

Awards for SE77-55

Institution	Grant Number and Title	Project Director	Amount	Duration (months)
Exploratory Research				
San Diego State U. San Diego CA 92182	SED77-18531; The Role of Cognitive Style in the Learning of Mathematics: A Research Study	Douglas B. McLeod Mathematical Sciences	$25,000	18
University of Florida Gainesville FL 32608	SED77-18543; The Use of Heuristics in Problem Solving: An Exploratory Study	Mary Grace Kantowski Mathematics	25,000	18
Michigan State U. East Lansing MI 48824	SED77-18545; A Study of the Teaching and Learning of Growth Relationships in 6th Grade	William M. Fitzgerald Mathematics	24,900	16
Smithsonian Institution Washington DC 20560	SED77-18913; An Investigation on the Effect of Field Trips on Science Learning	John H. Falk Chesapeake Bay Center for Environmental Studies Edgewater MD 21037	24,300	18
Rocky Mountain Mathematics Consortium Arizona State U. Tempe AZ 85281	SED77-18924; An Inquiry into the Graduate Training Needs of Two-Year College Teachers of Mathematics	Robert McKelvey Mathematics University of Montana Missoula MT 59801	25,000	18
U. of Massachusetts Amherst MA 01003	SED77-19226; Identifying Different Levels of Understanding Attained by Physics Students	Frederick W. Byron, Jr. Physics and Astronomy	20,900	22

90%